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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,686	08/25/2003	Daishi Yoshikawa	116925	9969

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EXAMINER

CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/646,686

Applicant(s)

YOSHIKAWA, DAISHI

Examiner

Gregg Cantelmo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-21 is/are pending in the application.
- 4a) Of the above claim(s) 7-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/30/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the amendment received August 30, 2006:
 - a. Claims 7-21 are pending with claims 7-16 withdrawn from consideration;
 - b. The drawing objection has been overcome in light of the replacement drawing filed August 30, 2006;

Election/Restrictions

2. Applicant's election with traverse of the previous restriction in the reply filed on August 30, 2006 is acknowledged. The traversal is on the ground(s) that there is no serious burden to search all of the claimed inventions. This is not found persuasive because as set forth in the previous office action, Inventions I and II are related as mutually exclusive species in an intermediate- final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product, and the species are patentably distinct (MPEP § 806.05(j)). In the instant case, the intermediate product is deemed to be useful as a membrane in a sensor, electrolyzer, or a stand-alone sheet etc. and the inventions are deemed patentably distinct because there is nothing on this record to show them to be obvious variants. Inventions I and III are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by other processes

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such as mixing the proton conducting polymer in a fibrous bed which is not in a sheet form; molding or sintering the glass material, etc. Inventions I and IV are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the membrane of Group I can be used in other systems such as sensors, electrolyzers or in fuel cell operations which do not address crossover as recited in the process of Group IV.

The examiner has set forth various reasons as to why there would be burden to search all Grouped inventions. Applicant's rebuttal, while stating that there is no burden of search, makes this assertion without any clear and convincing reasoning to support their position. Since the examiner has set forth reasons for restriction between the aforementioned groups and since Applicant has not convincingly established the lack of burden, the requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

3. The information disclosure statement filed August 30, 2006 has been placed in the application file and the information referred to therein has been considered as to the merits.

Drawings

4. The drawings were received on August 30, 2006. These drawings are approved.

Claim Rejections - 35 USC § 112

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5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The ranges of claims 17-21 are indefinite since the lower limit of each claim fails to clearly associate a particular unit with these values. For example, in claim 17, the range recited therein is "between 20 and 300 micrometers". The lower limit of 20 does not include units and while it could be assumed that the lower limit is also 20 micrometers, the claim does not clearly require such.

Applicant is advised to amend each numerical value in the claims with an appropriate unit to overcome this rejection.

b. Claim 21 is indefinite. Claim 21 recites: that "The electrolyte membrane according to claim 17, wherein a thickness of the matrix embedded by the sheet is between 30 and 80% of the entire thickness of the matrix." It is not understood how the thickness of the matrix as claimed can be less than 100% of the entire thickness of itself, in particular between 30-80% of the entire thickness of itself.

c. The term "almost" in claim 20 is a relative term which renders the claim indefinite. The term "almost" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

There is no description in the original specification to ascertain what constitutes

"almost" as recited in the claimed invention. Absent any definition of the term, the particular claimed limitation is held to be indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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6. Claim 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denton in view of U.S. Patent No. 6,437,011 (Steck).

Denton discloses an electrolyte membrane comprising an inorganic glass fiber substrate impregnated with a proton conducting perfluorosulfonic acid (Example 1 as applied to claims 17-21). The proton conducting polymer and glass fiber substrate are integral with respect to one another (as applied to claims 19 and 20).

The difference between claim 17 and 18 and Denton is that Denton does not teach of the glass being a woven glass of the particular configuration recited in claims 17 and 18.

Use of both woven and non-woven glass materials as a mechanical core or substrate for a proton conducting electrolytic membrane is known in the art as shown by Steck (col. 10, ll. 55-60). Furthermore the instant application discloses that either woven or non-woven glass cores are suitable alternatives for the inorganic component of the membrane.

The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

As to the particulars of the fabric of the woven glass: First with respect to the size openings of the fabric and porosity, the ranges specified therein is a significantly vast range considering the membrane being employed as an electrolyte support membrane. Clearly, one of ordinary skill in the art would recognize that an electrolyte membrane

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would have 10-90% porosity so as to provide sufficient ionic conductivity across the glass fabric. Less than 10% porosity would adversely affect the ionic conductance of the fabric and thus make it an ineffective ion membrane support material. More than 90% porosity would obviously adversely affect the mechanical properties of the membrane which would create shorting between the electrodes. Thus a porosity range of 10-90%, which is an obviously vast porosity range, would have been clearly within the knowledge of one of ordinary skill in the art. Furthermore there is no clear evidence to show that this vast porosity range has any criticality. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

With respect to the size openings in the fabric:

As discussed above, the range specified therein is a significantly vast range considering the membrane being employed as an electrolyte support membrane. Clearly, one of ordinary skill in the art would recognize that optimization of the size openings would relate to the mechanical and ionic properties of the film, much the same way as the porosity, discussed above, would. Optimization of the spacing of the fabric provides for both improved mechanical support and ionic conductivity. Thus the claimed size openings would have been clearly within the knowledge of one of ordinary skill in the art since it would have optimized both the mechanical and ionic properties of the glass fabric support. Furthermore there is no clear evidence to show that this vast porosity

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range has any criticality. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Response to Arguments

7. Applicant's arguments with respect to claims 17-20 have been considered but are moot in view of the new ground(s) of rejection.

Reviewing the claimed invention in light of the disclosure of the instant application leads the Examiner to conclude that the particular glass fabric claimed is not a novel contribution to the art for the following reasons:

First as found on page 8, paragraph [0008] of the specification: "A preferred example of the inorganic fiber constituting the sheet is glass fiber. Non-woven cloth and woven cloth made primarily of glass fiber (e.g., glass cloth) are widely commercially available and easily obtainable. Sheets made by cutting these to an appropriate size according to necessity can be suitably used. In addition, sheets composed primarily of glass fiber are easy to handle."

Secondly a review of the disclosure pertaining to the membrane support structure suggests that any number of materials may be used as the substrate. See page, 7 of the specification, which recites: "And examples of the inorganic fiber that constitutes the sheet are glass fiber, carbon fiber, alumina fiber, silicon carbide fiber, silica fiber or another ceramic fiber, magnesium oxysulfate whisker, potassium titanate whisker, and

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aluminum borate whisker. Of these inorganic fibers, glass fiber can be particularly preferably used. A woven cloth or non-woven cloth made by forming these inorganic fibers into a sheet is desirable. Woven cloth can be woven with a weave such as plain weave, twill weave, satin weave, or leno weave. The cloth can be one in which the individual inorganic fibers are directly woven or one in which the inorganic fibers are bundled and the resulting threads (e.g., glass yarns (glass threads)) are woven. The sheet can be a combination of two or more types of inorganic fiber. [0016] An example of one preferable sheet is a glass cloth of woven glass yarn (typically, plain woven). The fiber width of the glass yarn constituting such a glass cloth, when the sheet is viewed from thickness direction, is preferably in the range of about 5 to 300 μm and more preferably in the range of about 10 to 150 μm . The opening in the glass cloth is preferably in the range of about 10 to 500 μm and more preferably in the range of about 20 to 300 μm .

Thus it is apparent that the particulars of the claimed fabric appear to be conventional fabrics materials which are known in the art. And there is no clear and convincing evidence to show that the claimed glass woven fabric imparts novel and unexpected results in the context of the claimed invention.

It is well recognized that woven glass fabrics are used as electrolyte membranes that, as established above, and that both the broad range of porosity and size openings are optimized parameters to provide both sufficient mechanical strength and ionic conductivity of the membrane. Applicant has not shown that the particular claimed

fabric has novelty in the art. Therefore, the claimed glass fabric is held to be one which is recognized to one of ordinary skill in the art, absent clear evidence to the contrary.

Therefore the claimed invention is held to be obvious over, at least, the prior art rejection of record.

Conclusion

8. Applicant is invited to submit a list of recognized glass fabrics which were recognized by Applicant as being commercially available and easily obtainable, in order to clarify the patentability of the claimed glass fabric.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



gc

November 2, 2006

Gregg Cantelmo
Primary Examiner
Art Unit 1745